

Comparing Wait-Time Strategies in a Year 7 Mathematics Class

What effects will the use of three different wait-time strategies have on three Year 7 students with challenging behaviours who are achieving below their chronological age in mathematics?

Research Project Report submitted in partial fulfilment of the requirements
of the degree of Master of Teaching and Learning

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July 2009

Abstract

The use of formative assessment in the classroom is becoming a more widely used practice and acceptable way to support students' learning. There are several different strands to the formative concept of assessment *for* learning as opposed to assessment *of* learning. This research project looks at one strand of formative assessment, namely, the use of wait-time in the classroom. Three wait-time strategies were investigated and examples of their use are provided in an upper primary situation with three students of lower ability and challenging behaviours. Findings from this brief study show no conclusive evidence to support either the widely recognised use of increased wait-time to support a learner's needs or the opposing view that brief wait-time, when used with students with behavioural issues, might increase academic responses and improve on-task behaviours. The use of one of the strategies, that of 'talking partners', demonstrated a slight increase in academic responses with members of the focus group. This research project, together with limitations and further research suggestions, is discussed.

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Comparing Wait-Time Strategies in a Year 7 Mathematics Class.

What effects will the use of three different wait-time strategies used by a teacher during a mathematics class have on responses from three Year 7 students with challenging behaviours who are achieving below their chronological age?

Introduction

The use of wait-time during class instruction plays an important role in ensuring students are actively involved in the teaching and learning process (Black, Harrison, Lee, Marshall, & Wiliam, 2002; Clarke, 2005; Torrance & Pryor, 1998). Using increased wait-time as an organisational strategy during questioning has resulted in students' increased understanding, longer answers, a decrease in students failing to respond, together with increased confidence and attention (Clarke, 2005; Kauchak, Eggen, & Carter, 2002; Rowe, 1987; Stahl, 1990). It has been argued, however, that some students with challenging behaviour require less (1s), rather than more (4s) wait-time (Tincani & Crozier, 2007). They also noted that brief wait-time enabled the students to answer more frequently with slightly fewer non-responses, thus participating to a greater extent than with the use of extended wait-time. This opposing view goes against the use and increase in time given to students to support their thinking and processing when questions are asked by a teacher.

The New Zealand Curriculum (2007) stresses the importance of developing thinking skills in order that students can be “developing understanding, making decisions, shaping actions, or constructing knowledge” (p.12), therefore it is important to consider in a New Zealand context, and research, what will support students' learning. This study investigated the use and effectiveness of three different wait-time strategies on a focus group of three Year 7 students with varying academic and behavioural needs to identify which, if any, of the strategies supported the students' learning needs.

Participants and Setting

This small-scale, exploratory, research project investigated and compared the ‘wait-time’ strategies used by a teacher during instruction of a mathematics class which included children with challenging behaviours and varying educational needs. The mixed method study compared the use and effects on engagement of three wait-time strategies on three Year 7 students, the strategies being 1) actual wait-time used; 2) students’ hands up or down and 3) use of talking partners. These had been identified by Clarke (2005) as key points to support formative assessment.

Research tools included an observation schedule, together with video and tape recordings, to record the instances and strategies utilised by a colleague, as well as the engagement responses of the students (Appendix Eight). The observations, taken in a mathematics class, of three 11 year old male students with varying academic and behavioural needs, followed a single-subject, changing conditions design identified as being a suitable method of measuring the effects of teaching in class (Church, 1996). The research was triangulated using qualitative methods, including analysing transcripts of taped responses in class, semi-structured interviews with the teacher and the students (Appendix Nine), as well as anecdotal notes.

The teacher and students were invited to share their class time with me on a voluntary basis and were provided with an information and consent form advising them of details regarding the research process. The participants were also advised that they could withdraw from the project at any time without penalty.

Three Year 7 boys (John, Cam and Sam – not their real names) participated in this project together with their mathematics teacher, Mrs Black, again a pseudonym. They attended a mathematics class each day for 40 minutes together with 23 other mixed gender students. The class had been streamed using information from a national New Zealand Progressive Achievement Test (NZCER, 2006). The average level of the pupils in this class was around the 30th percentile of New Zealand tested children. The teacher was a first year teacher in her first teaching position.

Context

Formative assessment with its associated strands of questioning and wait-time has been building in use and recognition in education, especially since Black and Wiliam (1998) highlighted the significance to teaching and learning by asking the question, “Is there evidence that improving formative assessment raises standards?” (p.2). By changing the focus from ‘assessment *of* learning’ to ‘assessment *for* learning’ teachers can now use the data they have gleaned during assessment to modify future teaching in order to meet their students’ needs. Black and Wiliam also claim that “innovations which include strengthening the practice of formative assessment produce significant, and often substantial, learning gains” (p.3).

While it is known that increasing feedback to students helps to increase their learning (Clarke, 2005; Fuchs, L.S., Fuchs, D., Karns, Hamlett, Katzaroff, & Dutka, 1997; Hattie, 2002), what is not so clear is the effect of questioning and, in particular, the use of wait-time strategies on pupils with behavioural issues. Clarke (2005) argues that for lower-ability students, increasing the wait-time from a low one second to three or even five seconds can improve learning opportunities and depth of understanding by up to 700 percent, and for standard students, by as much as 500 percent (Cooper, 2006). However, in a recent study of students with challenging behaviours, Tincani and Crozier’s (2007) studies showed that the opposite was sometimes true, with reduced wait-time (1s) supporting the students’ engagement and learning, as well as their academic responses.

While Black and Wiliam’s research concentrated predominantly on secondary students, Clarke’s work has been with students up to the age of 10 years old, although she has recently extended her research programmes to include secondary pupils. Little is written, however, about the effects of formative assessment on intermediate pupils. The students I was interested in observing were aged 11, in Year 7, and with mathematics’ ages of between seven and nine years. Two of the children are diagnosed with dyslexia and have Attention Deficit Hyperactivity Disorder (ADHD), while the third student has dyslexia and dyscalcula. These afflictions are known to limit attention

spans and concentration times (National Institute of Neurological Disorders and Stroke, 2007) and the use of formative assessment has been shown to support and increase students thinking and responses (Clark, 2005; Cooper, 2006).

The school has been actively involved in using formative assessment strategies for the past four years, however this was a new intake of students as well as a new first-year teacher. Other students have been used to 1) specific learning outcomes; 2) higher order questioning; 3) self and peer assessment; 4) feedback and feed forward; and 5) building success criteria using exemplars. Initial observations were therefore required in order to identify the prior knowledge this class of new Year 7 students and their teacher. Three strategies of particular interest included 1) increases in the use of wait-time; 2) a hands-down policy when students were asked a question; and 3) the use of talking partners before replying to a question, all of which have been shown to be successful in engaging students and raising their awareness and understanding (Clarke, 2005).

Rowe's (1974) research had identified that teachers were leaving less than one second between asking a question and, if no reply was forthcoming, asking another question or reformed question, allowing students very little time to process their thoughts (Clarke, 2005; Cooper, 2006). As a result, lower order rather than higher order questions and answers resulted, and learning opportunities were lost (Black et al., 2002). Other benefits of wait-time indicated that students' failure to respond, which had been monitored at around 30 percent, dropped once wait-time was introduced to 5 percent or less, and students' participation increased (Cooper, 2006). Clarke (2005) also identified that on-task comments and questions and answers of a higher level also increased, from both the teacher and the students.

Black and Wiliam (1998) had suggested that there was a need for further exploration into the different views of learning and how formative assessment could support students' learning. There was also the opposing evidence by Tincani and Crozier (2007) of reducing wait-time for behavioural children to consider, and the focus group that I had identified related to both sides of the argument. The three boys had behavioural problems and there was a need to identify what might help them to

participate and answer more frequently in class. Using these ideas from the readings, I decided to investigate the claims further, and formulated research questions around wait-time strategies.

Literature review

Formative assessment is the ongoing assessment *for* learning to improve, rather than assessment *of* learning. Formative assessment takes place throughout the teaching and learning programmes, rather than at the beginning or end. It is said to be ‘formative’ when the feedback from learning activities is actually used to adapt the teaching to meet the learner's needs (Black and Wiliam, 1998).

Research conducted by Sadler (1989) identified three elements that were important to the effectiveness of formative assessment:

1. helping students to recognise clearly the desired goal, and to appreciate what high quality work looks like
2. providing students with evidence about how well their work matches that goal
3. explaining ways to close the gap between the goal and their current performance, and helping students to develop the skills required.

Formative assessment strategies used more recently by teachers to support their students include several strands that were identified as being important from research conducted by Black *et al.*, (2002); Clarke, *et al.*, (2003); Crooks, (1988). The main areas that Clarke *et al.* identified (2003) as supporting student achievement included:

- sharing specific learning outcomes
- providing feedback and feed forward (Hattie, 1999)
- questioning effectively (including wait-time)
- modelling and utilising exemplars
- involving students in self and peer assessment
- sharing success criteria

Hattie (1999) explained that, “The simplest prescription for improving education must be dollops of feedback – providing information about how and why the child understands and misunderstands, and what directions the student must take to improve” (p. 9).

Sutton (2000) further clarified what was required to teach effectively by stating that,
We may need to teach less in order for the students to learn more. Teach less more carefully, and discuss it with our students. We need to clarify the purpose and expected outcomes of the tasks we design for students, and give them specific, clear and constructive feedback, and the chance to use that feedback to improve their own work (p.11).

Black and Wiliam (1998) continue, explaining that, “The dialogue between pupils and teacher should be thoughtful, reflective, focused to evoke and explore understanding, and conducted so that all pupils have an opportunity to think and to express their ideas.” (p 12). Focusing on the dialogue of the students observed in class during the research process was crucial in helping to analyse and understand the data.

With regard to questioning and self assessment, Sadler (1989) states that,
If pupils are to become competent assessors of their own work, as developments in metacognition tell us they should, then they need sustained experience in ways of questioning and improving the quality of their work, and supported experience in assessing their work in addition to understanding what count as the standard expected and criteria on which they will be assessed (p.120).

The purpose of this research project was to study students’ reactions and responses to a variety of wait-time strategies used by their teacher when asking questions during their mathematics class. Wait-time is the pause between the end of a teacher’s question and the beginning of a student’s response (Rowe, 1974). Stahl (1994) reports an average teacher pause, or wait-time, to be between 0.7 and 1.4 seconds. In her study, begun over 30 years ago, Rowe (1974) noted differences in interaction between the teacher and students when wait-time increased to three seconds or more. Several benefits for

both the student and teacher were found when a minimum of three seconds of wait-time was allowed. Clarke *et al.*'s (2003) research noted similar trends: longer and more correct responses; fewer "I don't know" responses; more volunteering; appropriate responses by larger numbers of students; and increases in achievement levels.

Teachers also benefited with a greater variety in their questioning strategies, and the quantity of their questions was replaced with a higher quality of questions (Rowe, 1974; Stahl, 1994). In addition, Rowe (1986) also found more coherence in discussions between students, and between students and their teacher, as well as improved motivation, resulting in improved discipline in the classroom (Cooper, 2006). Rowe (1978) added to previous research by sharing that a minimum of three seconds wait time restructured the learning, by allowing students to evaluate their thoughts and the ideas of others in the classroom.

Another aspect that affects wait-time is the rate at which a teacher presents information, as it should match the thinking and processing abilities of the students (Tobin, 1986, 1987). In mathematics' classes, Tobin (1986) discovered that, when extended wait-time was given, there was an increase in higher order questions and a decrease of questions seeking basic comprehension. Wilen (2004) also recognised that wait-times of three to five seconds increased the quantity and quality of student responses, adding that students needed to be given time to understand the question, as well as connect the content to past knowledge and experiences, and formulate and provide a response. Wilen (2001) noted that students from all levels became frustrated when teachers did not give them sufficient time to think out thoughtful and supported replies. These insights were useful when observing the students with challenging behaviours and differing class needs during the research project.

One major aspect of successful teaching is the interaction between the teacher and the student. A teacher's planning and choice of questions plays a significant role in the type of learning that occurs within the classroom (Clarke, 2005). Mason (2000) states that "the style and nature of questions encountered by students strongly influences the sense that they make of the subject matter" (p.97). Good questions can help to lead students in thinking and using communication in ways that will draw upon their prior

knowledge, as well as construct new meanings to the concepts being presented (Clarke, 2005).

Good and Brophy (2003) advise that wait-time should be suited to the questions being asked and ultimately the goals the questions have been designed for. While extended wait-time has been associated with more student-to-student interactions (Honea, 1982), and higher achievement (Riley, 1986, Tobin, 1986), Duell (1994) experienced different results, stating that “Contrary to predictions based upon prior research with younger students, extending wait time to 6s actually lowered higher level cognitive achievement” (p.397) with his university students.

Swift and Gooding (1983) researched the effects of questioning and wait-time on the quality of discussions in 40 middle school science classes and found that the questioning skills made little difference; however, using increased wait-time resulted in the students being engaged more during discussions.

Tincani and Crozier (2007) challenge previous research and claim, through their studies with children who demonstrated challenging behaviour in class, that “Brief wait-time increased children’s response opportunities, academic responses, and accuracy in comparison to extended wait-time” and that, though variable, “brief wait-time also decreased children’s disruptive behaviour” (p.1). They also suggest that further research is required to examine the contradictory findings. Thus, this research project was aimed at using the available literature to examine the claims for and against the different wait-time techniques, by conducting a series of observations in order that a case study into the effects of wait-time used with students of varying behavioural and academic needs could be researched.

For this research, Cowie and Bell’s (1996) definition of formative assessment as “the process used by teachers and students to recognise and respond to student learning in order to enhance that learning, during the learning” (p.3) was used.

Research Questions

The key research question that was investigated in this study was:

What effects will the use of three different wait-time strategies used by a teacher during a mathematics class have on responses from three Year 7 students with challenging behaviours who are achieving below their chronological age?

Three wait-time strategies were specified:

- 1) changes in wait-time
- 2) use of 'hands down' following a question
- 3) use of talking partners

Further supplementary questions included:

What changes (if any) were there in the level of:

- academic responses?
- unsolicited responses?
- responses related to higher order thinking?

Glossary of Terms

Formative Assessment: a range of formal and informal assessment procedures (for example, the monitoring of children's writing development, anecdotal records, and observations) undertaken by teachers in the classroom as an integral part of the normal teaching and learning process in order to modify and enhance learning and understanding. (Ministry of Education, 1994).

Higher Order Thinking: the higher order thinking skills which include: analysis, synthesis and evaluation. These three levels are designed to engage learners to think at more critical and creative levels.

Higher Order Questions: questions that encourage students to analyse, synthesise, or evaluate information presented in order to provide a solution.

Lower Order Questions: questions that are knowledge-based that ask students to recall answers.

Wait Time: the interval between the end of a teacher's question and the start of a student response (Rowe, 1986).

Engagement: the extent to which students are committed to, and participate in, class, curriculum and school activities.

Teacher: the full time member of staff at school tutoring a class.

Triangulate: a method of conducting research which can result in an increase in both the quality and quantity of data gathered. Three or more sources are normally used, and can include: observation, a unit of analysis, interviews and reflective journals.

Dyslexia: a specific reading disability due to a defect in the brain's processing of graphic symbols, (<http://www.medicinenet.com>).

Dyscalcula: a specific developmental disability affecting a person's ability to conceptualize and perform mathematics, (<http://www.medicinenet.com>).

A.D.H.D. - attention deficit hyperactivity disorder: a persistent pattern of inattention or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development (National Institute of Neurological Disorders and Stroke (NINDS/NIH) February 9, 2007).

Methodology

A case study was used to research the effects of three differing wait-time strategies on a focus group of three students because, as Stake (1995) explains, a case study

summarises the ‘interpretations and claims’ of the researcher and allows for additional personal experiences to be added to the overall claims. Bogdan and Biklan (1992) state that “a researcher’s standpoint can be an entry into the data but while our theoretical and ideological views are powerful, they are shaped by what we learn from the informants” (p.34). This methodology therefore allowed me the opportunity to examine the data and evidence from various standpoints and respond to themes and trends as they emerged.

Mixed-method procedures were utilised during the study. The quantitative tool was an observation sheet (Appendix Eight) to support a single-subject, changing conditions design. The subject was the wait-time, and the changing conditions included the three different strategies to compare the effects of the interventions on the focus group of students (Alberta & Troutman, 2006). This enabled monitoring of rates of responses together with the use of the interventions (Church, 1996). I also chose to use this quantitative method as the observation sheet could be used “to measure the effects of changes in a particular aspect of the learner’s environment (such as a change in teaching method)” (Church, 1996, p.i).

The independent variables included:

1. a variety of lengths in the time, in seconds, given after the teacher had asked a question for a student to respond ranging from 1s to 5s
2. a ‘hands down’ policy, where the teacher asked for all students to keep their hands down and any student could be asked the question.
3. the use of talking partners before students responded to questions

The dependent variables investigated were:

1. the students’ frequency to offer answers to their teacher’s questions (when ‘hands-up’ was the strategy)
2. a “Don’t know” reply during the ‘hands-down’ strategy
3. the number of impulsive ‘call-outs’, unsolicited response and disruptive behaviours (from members of the focus group)
4. students’ responses related to higher order thinking – measured using cue words of: How?, Why?, and What if? (Bloom, 1956).

Cresswell (2003) explains that mixed methods studies can include testing theories deductively to verify outcomes, or inductively as an “emerging theory or pattern” (p.136). These suited the parameters of this research as I was interested to see which of the theories, increased or decreased use of wait-time, together with the other two strategies, might support the three boys in the focus group. It also enabled me to look at the evidence both quantitatively and qualitatively.

Qualitative methods used to collect data from the teacher and students included semi-structured interviews (Appendix Nine), the use of video and tape recordings, as well as notes containing anecdotal evidence from observations and informal discussions with the teacher involved in the research.

The semi-structured interview questions (Appendix Nine) focused mainly on:

For the teacher:

- How have the different wait-time and questioning strategies influenced your teaching?
- What differences (if any) have you noticed in your students following the wait-time strategies?

For the students, in a group interview:

- How have the different wait-time and questioning strategies affected your learning?
- What (if anything) has helped you to learn better?

Together, these methods supported my research allowing me to investigate and observe the three students and collect information using the variety of data collection procedures to triangulate the research (Cresswell, 2003, & Stake, 1995).

Sources of Data

I took observations during three 30 minute sessions each week for five weeks during the students’ mathematics class. The first three sessions in the first week were used to

collect information for baseline data (Appendix Eight). Thereafter, the students were introduced each week to a slight variance in wait-time. For instance, the second week was concentrating on an increase from one second to three seconds and, during the third week, the wait-time was further increased to allow a five second wait-time between the question being asked by the teacher and a response being requested of a student. During the fourth and fifth weeks, two further strategies were introduced, namely a 'hands-down' policy for the students and the use of 'talking partners'. These strategies had been identified as being important interventions to support students during their formative learning (Clarke, 2005).

The three students were seated in the same seats, according to the teacher's seating plan, for the duration of the observations in order to minimise any other variables that might influence the data. Each student sat beside a quieter boy in a group setting of six students. I sat at a single desk adjacent to the focus group of students. This was a streamed class designed to support students who were achieving below their chronological age. Their teacher was a first-year teacher who also taught senior mathematics and science.

During the baseline gathering period of three lessons, I asked the teacher to proceed with her planned lessons while I recorded the students' behaviours and responses to her questions. Prior to each of the intervention periods, I explained to the teacher which strategy to focus on and modelled examples. For instance, for increasing the wait-time between asking a question and expecting an answer, I suggested counting internally with intervals of time increasing from one second to three seconds and finally to five seconds by the sixth lesson.

For the introduction of 'hands-down', I asked her to explain to the class what she was going to be doing and trial the strategy (Church, 1996) during the lesson prior to my observing the use of the strategy for three lessons. Similarly, for the final week, and the introduction of 'talking partners', I requested that she trial the procedures prior to my visits.

Ethical Considerations

Key ethical implications were addressed as follows:

- the Board of Trustees supported the application to research this project
- approval for the research project was formalised through information letters and consent forms to the Board of Trustees, teacher, targeted students and their caregivers, (Appendices 1-7)
- ethical clearance was granted by the University of Canterbury College of Education Ethical Clearance Committee
- the teacher and students were advised that joining the project was voluntary, and they could withdraw at anytime without penalty; it was also explained that all information was confidential, and pseudonyms used
- all data, tools, analysis and reports are now secure and locked in the researcher's safe and will be for a period of five years

Great care was taken to minimise any risks or misunderstandings through open communication with all parties at all times.

Results

Observations of the students in class over a period of five weeks yielded a variety of results. Baseline data was collected over the first three lessons, comprising the use of the Unit of Analysis spreadsheet (Appendix Eight) together with a notebook, video and tape recorder to add anecdotal remarks.

Once the baseline data was gathered from observing the teacher and the students, the teacher was invited to share the observations to date and I explained what was likely to follow. She was requested to implement the first wait-time strategy of extending the wait-time from one second to three seconds, by counting internally to three before asking a student a question. Three half-hour sessions were observed using this strategy before an increase from three to five seconds was implemented for this first wait-time strategy.

The results from the five weeks of observations (Figure 1.) depict the responses of the three students before, during and after interventions were introduced. The variables were used to measure the effect on academic responses of the students during the wait-time strategy trials in class following the collection of baseline data over a period of three lessons.

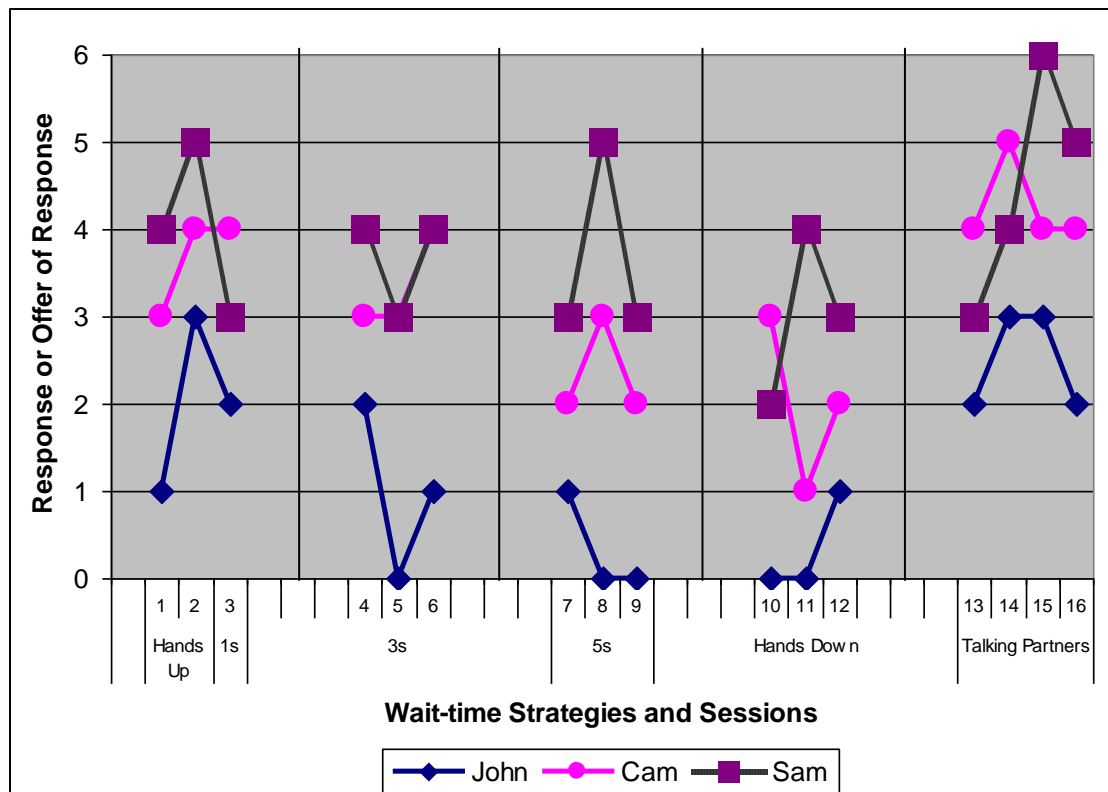


Figure 1. The number of responses offered by three 11 year old boys after being asked a question during five experimental conditions: 1) the use of 'hands up' and 1s wait-time, 2) an increase of wait-time to 3s, 3) a further increase of wait-time to 5s, 4) students keeping their hands down and 5) the use of talking partners before responding to a question.

Figure 1 illustrates the initial three baseline observation sessions where the teacher was observed using a 'hands up' policy with her students. The time allowed for a student to respond to a question during the three observations was, on average, one second. The second wait-time strategy in Figure 1 shows the effect on the three boys' responses when the teacher increased the time allowed for them to respond was increased from one second to three seconds. The third wait-time strategies highlights John, Sam and Cam's changes in the number of responses when their teacher further increased the wait-time

from three seconds to five seconds. Sessions 10-12 illustrate more responses from the focus group of boys when another wait-time intervention, this time a ‘hands-down’ policy, was introduced. The final observations taken during sessions 13-16 show the use of the fifth wait-time strategy – the use of ‘talking partners’ to discuss a question before offering an answer.

Discussion

The graph illustrates the number of times that the three boys either replied to a question or had their hand up and were willing to respond. While there are few definite trends, it is interesting to note the slight changes in each of the boys’ responses.

John offered the least number throughout the study and actually appeared to be less responsive once the wait-time was increased (Figure 1). This change tentatively follows what Tincani and Crozier (2007) had discovered with their research into children with challenging behaviours, that less rather than more wait-time “enabled performance improvements” (p.1). John also raised his engagement and response level when ‘talking partners’ were introduced. Again, this follows Clarke, Timperley and Hattie’s (2003) formative assessment findings. As they explain, “Children typically are unwilling to risk making mistakes in public, and leave the answering of class questions to the few who appear to be able to respond quickly” (p.100). In this instance, however, not only John, but all three of the boys increased their responses when provided with the opportunity to talk over their reasons with a buddy before offering an answer.

Cam’s results were quite similar to John’s except that he offered more answers throughout the timeframe of the study (Figure 1). By nature, he appeared to be more confident, and again this was evident during the ‘talking partners’. However, he demonstrated the most significant fall in answering during the ‘hands-down’ policy. What is not evident is whether he knew the answer to the question or was simply not chosen to respond very often by his teacher during that three week spell. Certainly the research suggests that ‘hands-down’ is a very effective method for enabling students to

be thinking and processing answers when they do not know who is going to be chosen to proffer a reply (Clarke, 2005; Cooper, 2006).

Sam was the most enthusiastic of the group both in attitude and in his responses (Figure 1). His results showed the least regression, just a slight drop during ‘hands-down’, but again that could be reflected from the teacher’s choice of student to respond. The ‘talking partners’ sessions were the most evident of the wait-time strategies to show increased engagement for Sam, following even more pronounced results, doubling from three to six and back to five responses. His ‘talking partner’ was a good listener and allowed Sam to reply when the question was asked, and that might reflect somewhat on the results, nevertheless Sam’s disruptive behaviours also dropped during that four session period. This improvement in behaviour has also been noted in Tincani and Crozier’s (2007) research, as well as in other literature (Clarke *et al.*, (2003); Cooper, 2006).

Interviews

Mrs Black was interviewed in a face-to-face, semi-structured format the week following the last observation. The venue was the classroom that she had been teaching the three students in, as she felt it would be easier to explain and remember what had happened. The interview (Appendix Nine) lasted for 25 minutes and the following extracts are from relevant transcribed parts of her reflections of the effects of the three wait-time strategies.

When asked about her experiences, Mrs Black explained that she was really pleased to have taken part and that she had “learnt a lot”. When I asked her to explain in more detail, she replied,

Well, in everything, really. I learnt about my own teaching, heaps...I’ve got so much more to learn too. I can now see what’s going on more clearly, like, what the kids are doing...when they’re actually talking about maths or just pretending. Like, when you got me to do the ‘hands down’, that was hard to begin with, I just couldn’t get the hang of it, even though

we'd tried it out. You know...I'd say the boy's name first instead of last...it took me a while to realise that the others, especially your lot (three boys) weren't paying attention...that was annoying.

I asked her to clarify what was annoying about it and her reply highlighted her first year teaching experience:

Well, you know...why weren't they listening and trying to answer too? They just kept talking or mucking about, so then, I'd get angry and send them out... and then that mucked the rest of the class up, and you...sorry. Grr... it's hard.

That reminded me of how privileged we are as teachers to be able to share our experiences and to learn from them.

Mrs Black continued:

...once I remembered to ask the question and count [in seconds for wait-time] while I was checking who was on/off-task it helped me to see who was getting it... that really helped...it was a big moment.

I interrupted, asking:

Can you tell me more about the counting and increasing the wait-time?

Mrs Black replied:

Yes, I had to count with my fingers to begin with as you'd shown me I was only giving them less than a second, remember? [Yes] So, once I got the hang of the three (seconds) it was easier to go for five [seconds]. Mmm, yeah...worked well, could see...yeah...well not always for your boys, did it? [No] Wonder what it'll be like later, mmm...yeah, I'll keep giving it a go though....that 'talking partners' was good, wasn't it? [Yes] Yeah, don't do it with the seniors, 'cos no time, but it really helped the young ones, don't you think?

Yes, in what ways? Can you explain, maybe thinking back to the three boys?

Mrs Black:

Well, especially the way they helped each other, it was good to see. Remember when Jack helped Cam? That was good, he really got the hang of it later, you were out, I think. And Sam, he's now working better with Brian, that's a huge change, still not always good, but definitely better... must try it with my Year 12s.

What about when they failed to respond?

Mrs Black:

Well, you know, I kept trying...I'd do it in a different way sometimes... that helped...the 'talking partners' helped with that, didn't it? [Yes] I'd get annoyed though, I mean, we'd been over and over it...mmm, yeah, well, like I said, I'd send them out sometimes if they weren't paying attention, mmm... didn't always know if they got it? That's why I'd use you (the researcher) sometimes...that helped...meant I could help someone else too.

What about when the boys kept interrupting and were disrupting the others? What differences, if any, have you noticed with using the strategies?

Mrs Black:

Well, some...they still do it a lot, especially John, he's awful, he keeps forgetting to take his pills [ADHD]...and then he's right-off, just about impossible...got to help the others. But, yes, Cam and Sam are sometimes better, not always with the counting [wait-time], but definitely with the buddies [talking partners].

Oh, that's good to hear, worth all that effort then?

Mrs Black:

Yeah, definitely!

Remember how we talked about lower and higher order questions? What are your thoughts on that now?

Mrs Black:

Mmm, well... I'm still not sure.. When we talked about it, it made sense, but I kept forgetting and getting mixed up...I know you gave me some examples, but...I...

No, that's my fault, it's mm...something that takes a lot of time, and we just didn't have that, sorry...ehmm...maybe it's something that we could look at later?

Mrs Black:

Yeah, great, I'd like to... just a bit on the go at the moment...

I learned a lot about my own developing leadership skills as well as about the project. I realise now that I need to remember to take things a step at a time, and practise what I am working and reflecting on in order to be a reflective, supportive and effective coach (Robertson, 2005).

The qualitative data from the teacher interview suggests some benefits for the teacher in using the increased wait-time, but only for two of the students. The student with the most obvious disorders, namely ADHD and dyslexia, did not appear to be positively affected - in fact, the reverse. Mrs Black stated:

John just never stops, no matter what I do, short or long [wait-time], or 'buddy-talking' ...doesn't seem to make any difference...I just can't get him to work... he just disrupts the others...

This is her first year teaching at a school, however, and therefore, at times, she found it difficult to focus on any one of the three areas of study. For instance, the 'hands down' trials were inconclusive as sometimes she chose a student with their hand raised and sometimes one who had their hand down but was off-task, and only occasionally did she ask questions of the focus group of students.

Further Discussion – Research Questions and Tools

The questions from the teacher were predominantly at a recall level, such as, “What is?” and “How many?”, thereby providing few instances for any of the students to formulate higher order types of questions (Bloom, 1956) in reply, for example the use of “Why?” or “What if?” (Appendix Eight). Also, The New Zealand Ministry of Education’s (2002) Numeracy initiative explains that the emphasis for teachers is to question the pupils about the strategies that they use and try to understand the variety of processes that they use to come to their answers. During the 16 sessions of observation, there was little evidence to support through her questioning what “mental processes [the] students used to estimate answers and solve operational problems” (p.1). However, the use of ‘talking partners’ and discussing a question with a buddy before providing an answer (Clarke, Timperley & Hattie, 2003) could be evidence to support the Numeracy Project’s objectives.

Similarly, Black *et al.* (2002) state that “More effort has to be spent in framing questions that are worth asking; that is, questions which explore issues that are critical to the development of students’ understanding” (p.7). This is an area that the teacher, as a beginning teacher, is just beginning to realise is important.

The three students were frequently removed by their teacher from the class, individually and collectively, for short and prolonged periods of time due to their disruptive behaviour and the beginning teacher’s behaviour management programme. This changed the reliability and frequency of collecting the data as, when the students returned to class, they were commonly sullen and disengaged. A longer observation period, together with the use of observing a more experienced teacher in a smaller class situation, might have provided different opportunities for trialling the three strategies.

The use of video and tape recording resulted in mixed success. The video could not be used on several occasions because a) the students spotted the red recording light despite the camera being ‘hidden’ and began disrupting the lesson, and b) the video

could not be placed close enough to accurately hear the discourse amongst the three students. Similarly, the tape recordings were ineffective on many occasions due to the extraneous noise from the rest of the class. When the tape recorder was positioned closer to the focus group their behaviour changed with attention being directed towards the tape recorder rather than to the instructions and questions from the teacher.

Additionally, when I was taking notes during class observations, the three students and several of their classmates would frequently watch me rather than pay attention to the lesson. However, as Gay and Airasian (2000) explain, it can be difficult to manage the research and research tools when individuals are involved.

Another reliability issue was the accuracy of the timings. I started by using a stopwatch but found that trying to operate that and record behaviours at the same time was impractical and, when I introduced the tape recorder to overcome this problem the behaviours of the students changed and I became worried about how that might affect the data.

Although I had rehearsed the testing procedures (Church, 1996) with my own class, the differences in styles of teaching and the cohort of students limited my degree of fluency when registering the behaviours of the students during the observation periods which might have affected the resultant data.

My observations were frequently interrupted when I was also used as a resource during the lesson if a group of students did not understand a concept, required extra help, or when the teacher left the classroom to speak to the students that she had removed from the classroom.

As well as the students being removed from class on a regular basis, one of the pupils, John, was sick for three days, therefore involving delays and interruptions to the flow of the wait-time strategies that the teacher was trying to introduce.

Clarke (2005) explains that it is 'essential' to spend time training and supporting talking partners and in this study that was not factored adequately into the sessions – I

only had time to provide short explanations to the teacher before she explained to the class about working and listening to each other carefully. Thus, again, the reliability of the data needs to be viewed in relation to the time frame and duration of the project.

Students' Interview

During the students' interview (Appendix Nine) it became apparent that they had noticed and enjoyed the extra attention. However, they appeared to have taken little notice of the extra time allowed for answering questions, or of the 'hands-down' policy. The possible exception was for the 'talking partners' intervention – they appreciated the extra time to talk, and for two of them, Sam and Cam, they thought that they managed to complete some extra work and learn a bit from their 'buddies'. Sam commented that:

I liked working with Brian (boy seated beside Sam)... he knows stuff... like how to do that houses thing (place value: ones, tens, hundreds)... he showed me where to put some of the numbers...oh, and some of the coloured bits (counters)...yeah, that helped.

When I prompted the boys about what else had helped them no mention was made of the increased wait-time, however when I asked them about having extra time to think, Cam replied:

Mmm, I like when I have to sort of think about it more, 'cos sometimes it's hard and I don't get it. (Sam nodded). John was fiddling then added, nah, too easy, ha ha. Cam interrupted, no, it's not!

I changed the focus and asked about the 'hands down' part. John shouted that he *liked waving*. Sam and Cam thought for a minute and then explained that they kept forgetting. Sam added:

I wanted to answer sometimes but she didn't choose me so I spoke to John instead 'cos he was trying to get me! [my attention].

None of the boys mentioned whether or not it had helped them and, when questioned further, they did not know. What they had noticed and enjoyed was the use of the counter and 'houses'. They also suggested that they would prefer to have more games to help them.

John had challenged the teacher on more than one occasion during the wait-time when I was observing. For instance, at the beginning of a lesson, the class were recalling their times-tables and the teacher was explaining that they already knew a lot more of their tables than they thought they did because they could reverse them. She started with the 2 x and modelled 2 x 4 was the same as 4 x 2. She used three second wait-time to ask students the rest of the table and in reverse. When she arrived at 9 x 2, John shouted out within one second, *9 x 2 is 18* (in a really rude manner). When the teacher replied that it was the correct answer and reminded him to wait his turn, he jumped up and started shouting, *agh, my foot, my foot, my foot* then proceeded to cross the room and start chatting with other students and laughed when Mrs Black asked him to sit down. He was removed from the class. During the following observation period John remained on-task, either answering a question or following instructions, for a total of only three minutes out of the 30 observed. It would be interesting to examine at a later date what the teacher's learning intentions are for John, and how she wishes to increase his understanding through questioning (Clarke, Timperley & Hattie, 2003).

On another occasion, at the start of the 'hands down' strategy, John had announced on his arrival that he was *feeling sick*, however as soon as I started writing John shouted across the group and fired a barrage of questions at me that were not related to his mathematics class. I ignored him to begin with and continued writing, however he got out of his desk and started pointing to what I was writing. When asked to return to his seat by his teacher, he refused and kept asking questions and laughing. At this point I had to abandon my observations and worked with John in order that the teacher might continue with her lesson and 'hands down' policy.

During that particular lesson, I noted Sam and Cam had their hands up twice and were ignored by Mrs Black, however as soon as she reminded the class about ‘hands down’ and asked the next question, Sam was trying to attract her attention but managed to keep his hand down and was rewarded by Mrs Black asking him what the answer was and praising his correct response. Cam copied Sam’s antics during the next question while John did not appear to participate and scribbled all over his page.

During another ‘hands down’ lesson (Appendix Eight), John was off-task for the entire 20 minute period: either poking his neighbour, scribbling in his book, calling out, leaving his desk, muttering or reading his diary. Sam called out three times, *What’s the number?* and two minutes later, *Yeah, but what’s the number?* Eight minutes later, *Do we get detention?* He worked for a total of three minutes out of the 20 and answered once by shouting out the wrong answer with his hand up. Cam on the other hand, apart from muttering, *I can’t help it*, three times; whispering to his buddy, *I don’t get it!* and shouting out, *I’m finished!* to the teacher, appeared to be more focused and was listening to the questions while keeping his hand down.

However, the following lesson, still with the ‘hands down’ strategy in place (Appendix Eight), John succeeded in answering one question correctly by shouting out the answer, but was off-task for the remainder of the time. Sam answered one question with his hand down and asked three questions of the teacher and his buddies to confirm what he was supposed to be doing, then asked Mrs Black at the end, *Was that better?* When his teacher acknowledged that it was, he proceeded to pull his pen to bits and spread ink everywhere.

Meanwhile, Cam was trying his best to distract Sam and John for half of the time, worked for five minutes, was out of his seat twice, and the only question he asked or answered was addressed to Sam, *How’d you do that?* (regarding the pen) which could be regarded as a higher order question, but was not relevant to the study as it was an off-task behaviour.

Off-task behaviours were defined as behaviours that were not related to the mathematics lesson and included talking to others about non-task matters, being out-of-seat, throwing items and physical pushing and shoving.

Further Discussion - Wait-time Strategies

Tincani and Crozier (2007), noted that students with challenging behaviour sometimes responded to more questions with the use of less wait-time rather than more wait-time. One lesson that I did observe this happening was during a ‘talking partner’ session where the students were working in groups of four and were using coloured felts on A3 paper to show their understanding of larger place values. Out of all the sessions it was the one where all three boys were the most visibly on-task for a consistent period of nearly 20 minutes.

Although the strategy was for ‘talking partners’ and there were times allowed for that over the four sessions, the most evident engagement was apparent when Mrs Black asked a series of short recall questions with durations of between one to two seconds. Within that 20 minute window, the teacher asked 11 questions and each of the boys had either answered or helped their buddy to work out the answer (Appendix Eight) on the paper provided. As soon as the answers were being shared in class, however, the boys started talking about pig-hunting, and twice they asked their buddy which question they were on when asked a question. What was also interesting was that the use of ‘hands up’ had been reintroduced and the class was competing for the teacher’s attention. However, in this instance, it appeared to stimulate the three boys’ attention (Appendix Eight) as they vied for her attention and called out their answers.

Rowe (1974), Clarke (2005) and Cooper (2006) on the other hand all argue that increased wait-time increases the likelihood of students responding to questions and at a higher level. They also have evidence to support the theory that the students are more likely to be engaged in their learning, so off-task behaviours will decrease. Clarke (2005, p.50) further explains that once students get used to the extended wait-time then:

- answers are longer;
- failure to respond decreases;
- responses are more confident;
- students challenge and/or improve the answers of other students;
- more alternative explanations are offered.

In this short observation period, there were few noticeable trends to support these claims, except for a slight increase in participation during the use of ‘talking partners’. The time-span of this short study prevented any of the interventions becoming embedded into the students’ routine or the teacher’s usual practice and, as Nelson *et al.* (2004) point out, students with significant behavioural issues frequently experience difficulties in mathematics, therefore their own expectations and self-efficacy (Hawk & Hill, 2004) regarding success is low. It would probably require a much longer time-span with more one-to-one or small-group instruction to support more confident, longer responses. Also, none of the focus group challenged or offered to improve any of their peers’ answers.

Tincani and Crozier (2007) shared one of their reflections that fitted in with this study. They explained that “The effects of wait-time may vary based upon instructional stimuli” (p.11). When Mrs Black, in my project, introduced the A3 paper and counters to the focus group, their attention and responses increased, therefore it could be argued that it was not just the effect of the use of a ‘talking partner’ but the additional change in their teacher’s practice. The students also referred to this lesson as one that had stimulated them (Appendix Nine).

Limitations

Some limitations that possibly affected the research project included the sample size of only three boys in a whole class setting, together with observing a first year teacher. A more experienced teacher might have worked through the range of wait-time strategies in a different way. There was a gender imbalance with only boys being used for the study, a mixed gender observation schedule might have provided more potential for

discussion. Finally, the time I allowed myself to observe the variety of wait-time strategies was probably too short in order to establish consistency in the use and observation of three linked but different strategies.

Most of these limitations in the research design were unforeseen during the planning phase and I thought that I had taken enough steps to avoid any extraneous variables (Church, 1996) however, extra time and changes to the recording methods would be required during another similar research project.

Conclusion

The research question was: *What effects will the use of three different wait-time strategies have on three Year 7 students with challenging behaviours who are achieving below their chronological age in mathematics?* Clarke, *et. al.* (2003) stated that three to five seconds was the “optimum time it takes to process the question and formulate the answer” (p.99). That may be true for the majority of students, however in this short study the results were not conclusive one way or the other with this particular focus group. With their diagnosed conditions, Tincani and Shannon’s (2007) research providing evidence that shorter rather than longer wait-time after asking a question and expecting a response might hold some sway. It would certainly be interesting to observe and further research this group, but possibly in a small-group situation rather than in a whole class setting, together with a teacher more experienced in working with children who demonstrate challenging behaviours.

Clarke, *et.al* (2003) claim that “formative assessment makes a significant difference to children’s progress – in their ability to be confident, critical learners, [who can] achieve more than ever before” (p.157). But, how true is that of this particular group of boys? Only three formative wait-time strategies were identified for this research project and the data from it suggested little effect was made to their progress and responses. However it would be difficult to justify such a claim based on just a few observations. Another study with a longer timeframe, for me, would be fascinating

because, as teachers, we all want to “make a real difference to children’s lives”
(p.157).

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Appendices:

Appendix 1

Board of Trustees - letter seeking approval



15 November 2008

Dear Board of Trustees

I wish to seek approval to observe and involve a teaching colleague and a group of children in a research project during Term 2, 2009.

The working title of my project is '*Comparing Wait-Time Strategies in a Year 7 Class*'.

Increased wait-time when questioning students during teaching practice has been identified as an important formative strategy when engaging students by allowing them more processing time (Clarke, 2005; Kauchak *et al.*, 2002; Rowe, 1987); however, it has been argued that students with challenging behaviour require less rather than more wait-time (Tincani & Crozier, 2007). It has also been shown to affect students' answers and understanding (Clarke, 2006; Glanz, 2005). This study will compare the use and effects of three wait-time strategies on a small group of Year 7 mathematics students with varying academic and behavioural needs.

The teacher will be invited to share her teaching practice on a voluntary basis and will be provided with an information / consent form. The participant will be able to withdraw from the project at any time without penalty. All data material will be kept secure in the researcher's office in a locked cabinet for a period of five years. No student, teacher or the school will be identified, as pseudonyms and codes will be used. The Ethical Clearance Committee from the University of Canterbury College of Education have reviewed and approved this study for EDTL802 within the Master of Teaching and Learning Degree.

I think that this study will benefit our school as it fits in with our established RAFA initiatives regarding formative assessment.

Thank you for taking the time to consider my request. I look forward to hearing from you in the near future.

Yours sincerely

Frances Nimmo

1. This project has received ethical approval from the University of Canterbury College of Education Ethical Clearance Committee.
2. Complaints may be addressed to:
Dr Missy Morton, Chair, Ethical Clearance Committee,
University of Canterbury College of Education, Private Bag 4800, CHRISTCHURCH. Tel:
364 2987

Appendix 2

Information letter to the teacher

15 November 2008



Dear XXX

I am working on a project for a university research assignment studying the effects of wait-time and questioning strategies used by a teacher in class. The aim of my study is to observe a variety of wait-time strategies to see if, and how, they affect the responses of students. I am asking if you would be interested in being a volunteer for this project.

Participation is voluntary and, if you do consent, you may withdraw at any time, without penalty, and without providing a reason. Observations would take place over a number of lessons that would fit in with your requirements, preferably with your Year 7 mathematics class. I would collect data by note-taking and/or tape/video recording as you trial different strategies that I will suggest, followed by an interview. You may view any notes/listen to recordings at any time, and I will welcome all feedback. There is no risk of being identified, as I will maintain the confidentiality of any information gathered, also your anonymity, and that of the school and students, through the use of pseudonyms and codes. Material associated with this study will be stored securely in a locked filing cabinet for a period of five years before being destroyed.

The Ethical Clearance Committee from the University of Canterbury College of Education have reviewed and approved this study for EDTL802 within the Master of Teaching and Learning Degree.

Should you have any questions or concerns about participating, please either phone me on 03 3184 007, or send me an email: fgnimmo@xtra.co.nz. My academic supervisor for this research course is Judy Williams, and if you have any concerns, please contact her at judy.williams@canterbury.ac.nz, or if you have any complaints, please advise the MTchLn Research Coordinator, Dr Missy Morton, at missy.morton@canterbury.ac.nz

Thank you for taking the time to consider my request. If you are willing to be a voluntary participant, please complete and return the attached Consent Form in the envelope provided.

I look forward to hearing from you in the near future.

Kindest regards

Frances Nimmo

Teacher's CONSENT FORM

'Comparing Wait-Time Strategies
in a Year 7 Class'.

I have read and understood the information contained in the letter.

☐

I understand that the material used from observations, interviews and questionnaires will provide anonymity and be confidential.

☐

I understand that I am participating voluntarily and that I have the right to withdraw at any time without penalty, including the withdrawal of any information that I have provided.

☐

I understand that all my responses will be kept in a locked filing cabinet for a period of five years before being destroyed.

☐

I hereby give my permission to participate in this research project.

☐

Name (*print*):

Signature:

Date:

-
1. This project has received ethical approval from the University of Canterbury College of Education Ethical Clearance Committee.
 2. Complaints may be addressed to:
Dr Missy Morton, Chair, Ethical Clearance Committee,
University of Canterbury College of Education,
Private Bag 4800, CHRISTCHURCH. Tel: 364 2987

Research Project: Comparing Wait-Time Strategies in a Year 7 Class

Information for Parents/Caregivers

Dear Parents / Caregivers

My name is Frances Nimmo. I am a teacher at your child's school. This year, I am also studying at university and carrying out some research to complete a Master of Teaching and Learning degree. I will be observing a class to look at how students respond to a variety of questioning strategies during a mathematics period. I am looking for volunteers and approaching the parents and children in your child's mathematics class.

If you and your child consent, then I will be recording some of the answers and comments made in class. Later, I will ask them some questions about the project. I will use this information to write up a report later on, but I will make sure that names are not written down as I will use codes instead for the children, class and school, so that they cannot be identified. All information will be treated as confidential, and kept in a locked filing cabinet for a period of five years before being destroyed. The University of Canterbury College of Education Ethics Committee has reviewed and approved this study.

If you or your child does not want to participate, that's fine, no one will mind. They will still be part of the mathematics class, but I will not write down anything concerning them.

Should you have any questions or concerns about participating, please either telephone me on 03 3184 007, or send me an email: fgnimmo@xtra.co.nz. My academic supervisor for this research course is Judy Williams, and if you have any concerns, please contact her at judy.williams@canterbury.ac.nz, or if you have any complaints, please advise the MTchLn Research Coordinator, Dr Missy Morton, at missy.morton@canterbury.ac.nz

Thank you for taking the time to consider my request. If you are willing for your child to be a voluntary participant, please complete the attached Consent Form, ***together with your child's signed consent form*** and return them to me.

I look forward to hearing from you in the near future.

Yours sincerely

Frances Nimmo

Research Project: Comparing Wait-Time Strategies in a Year 7 Class

Information for Year 7 Students

I would like to observe some classes and look at how the teacher and students use different types of questions and answers during mathematics for a university research project. I am approaching you and your classmates because your class meets the criteria.

I may record some of your comments and ask you some questions about the project. I will use these when I write up my report later on, but I will make sure your name is not written down as I will use a code instead.

If you don't want to participate, that's fine, and no one will mind. You will still be part of the mathematics class, but I won't write down anything about you.

Please discuss this with your parents/caregivers and if you are happy to take part, please read and sign the consent form. Your parents/caregivers will need to sign a form as well, and then return both of them to me.

Thank you for taking the time to think about joining this project. If you have any questions you can talk to me when I come to visit, or ask your mathematics teacher.

I look forward to hearing from you soon.

Kind regards

Mrs Nimmo

-
1. This project has received ethical approval from the University of Canterbury College of Education Ethical Clearance Committee.
 2. Complaints may be addressed to:
Dr Missy Morton, Chair, Ethical Clearance Committee
College of Education, University of Canterbury
Private Bag 4800, CHRISTCHURCH

Telephone: 364 2987

Research Project: Comparing Wait-Time Strategies in a Year 7 Class

Parent/Caregiver Consent Form

I have read and understood the information given to me about the research project and what will be required of my child/the child in my care.

I have discussed the project with *(full name)* _____ and am happy that he/she understands the nature of the project.

I understand that anything my child says during this research will be treated as confidential, that the identity of my child and the school will be kept anonymous, and that all information will be kept in a locked filing cabinet for a period of five years.

I understand that participation in this project is voluntary and that I can withdraw my child or he/she can withdraw from the project at any time without penalty.

I give permission for *(full name)* _____ to participate in the above project.

Name: _____

(Printed)

Date: _____

Signature: _____

Please return this form promptly, together with your child's signed consent form, to Mrs Nimmo. Thank you.

-
1. This project has received ethical approval from the University of Canterbury College of Education Ethical Clearance Committee.

2. Complaints may be addressed to:
Dr Missy Morton, Chair, Ethical Clearance Committee
College of Education, University of Canterbury
Private Bag 4800, CHRISTCHURCH

Telephone: 364 2987

Research Project: Comparing Wait-Time Strategies in a Year 7 Class

Year 7 Student Consent Form

I have read or listened to the information about the project. ☐

I have talked to my parents/caregivers about it. ☐

I agree to talk to the researcher, Mrs Nimmo. ☐

I am happy for the discussions to be recorded and no-one will know my name. ☐

I understand that this is voluntary, and I can change my mind about taking part in the discussion and no-one will mind. ☐

I know that if I have any questions I can ask my parents or caregivers, Mrs Nimmo or my mathematics teacher. ☐

Name: (print) _____

Date: _____

Signature: _____

<i>Please return this form to Mrs Nimmo - along with your parent / caregiver's signed form.</i>
--

-
1. This project has received ethical approval from the University of Canterbury College of Education Ethical Clearance Committee.
 2. Complaints may be addressed to:
Dr Missy Morton, Chair, Ethical Clearance Committee
College of Education, University of Canterbury
Private Bag 4800, CHRISTCHURCH
- Telephone: 364 2987

Appendix 8

Observation Schedule**Comparing Wait-Time Strategies in a Year 7 Class**

Tick which strategy is being used

Hands down	
Talking partners	
Wait-time	Increased
	Decreased

Teacher: **XXX**Subject: **Mathematics**

Date:

Period:

Question	Time (clock)	Wait- time (secs)	Student responding A,B,C	Length	F =	U =	H.O.T. =	Example	Notes	
				of response (secs.)	fail to respond	unsolicited response	Higher Order Thinking			
									7 students	
Example	9.05	3	B	7		U	HOT	So what if?	Student B waving,	
1									student C distracting A	
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

EDTL 802 Interview Schedule

Topic:

Comparing Wait-Time Strategies in a Year 7 Class

Qualitative Research Question:

For the teacher:

- How have the different wait-time and questioning strategies influenced your teaching?

For the students in a group interview:

- How have the different wait-time and questioning strategies affected your learning?

Interview Schedule – *with the teacher:*

After pleasantries, re-introducing the topic, and ensuring the interviewee was feeling comfortable about being interviewed with a tape recorder, the following areas were explored:

- Tell me about your experiences with trialling the different wait-time strategies
- What differences have you noticed, if any, in your students responses?
- How does this compare with earlier this year?
- There might have been some pros and cons with trialling these, tell me about some of the advantages first ...
- What about any disadvantages?
- What about the students' experiences?
- If you had to speak to some teachers during a PD session about wait-time and questioning strategies, what advice would you give them?
- Are there any other experiences you would like to share?

Thank you very much.

Interview Schedule – *with the students:*

After pleasantries, re-introducing the topic, and ensuring the interviewees were feeling comfortable about being interviewed with a tape recorder, the following areas were explored:

- Tell me what it was like having your teacher trying out different questioning techniques in class...
- What helped you?
- What did you not like so much?
- Which of the following ways would you like to see your teacher continuing to use? (You can choose as many or as few as you would like from:
 1. more time for you to answer
 2. less time for you to answer
 3. hands up
 4. hands down
 5. talk with a buddy first

Thank you very much for sharing your thoughts with me.